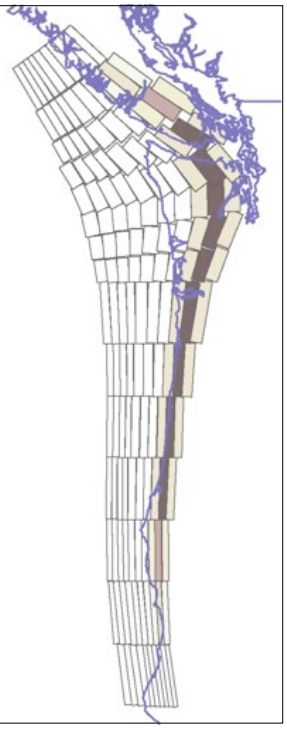
# Slow Slip Events On The Cascadia Subduction Zone



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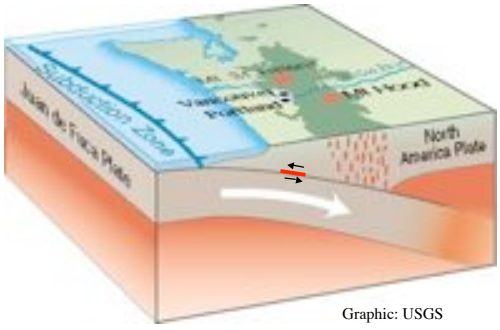
## Presentation Overview

- Introduction to slow slip events in Cascadia
- Slip distribution of Jan 2007 event
- Comparison of the past 4 events




Graphic: USGS

# Intro to slow slip events


Graphic: Hyndman & Wang (1995)

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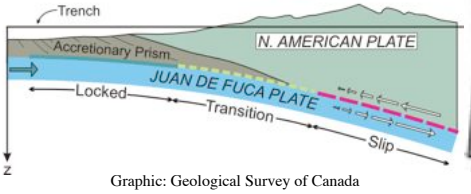


Graphic: Geological Survey of Canada


Graphic: Hyndman & Wang (1995)

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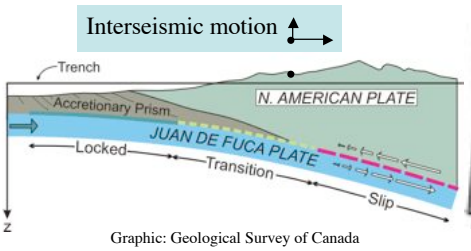


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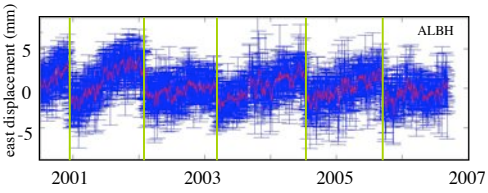


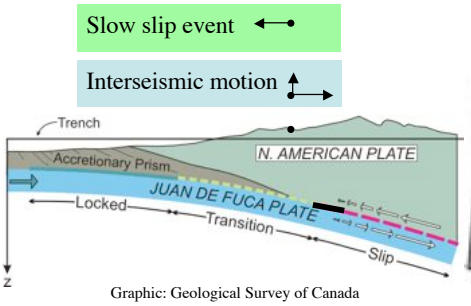


Graphic: Geological Survey of Canada


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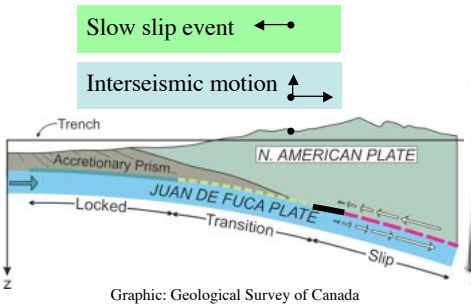
# Slow Slip in Cascadia:
## Key Observations

- Total duration ~10 days
- Limited to depths of 30-40 km.
- Maximum slip ~4 cm.
- 14 month recurrence interval.
- Associated with tremor.

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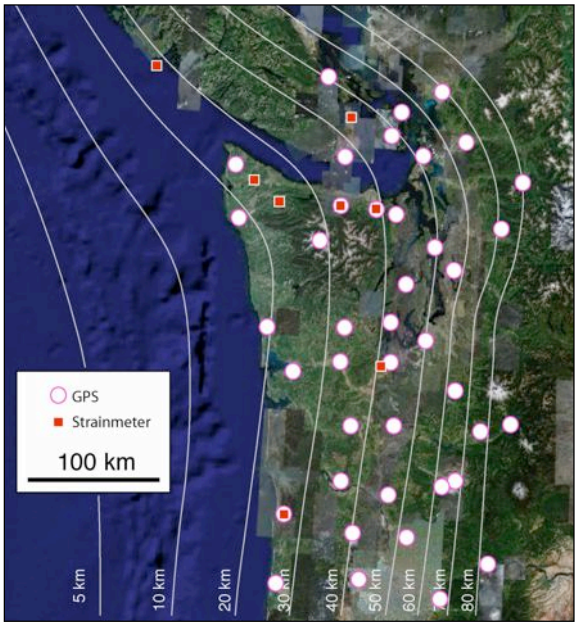
## GPS and Strainmeter Instruments in the PNW

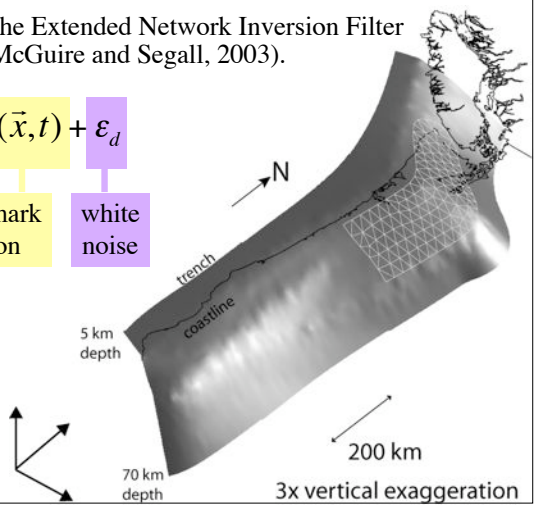


# Methodology

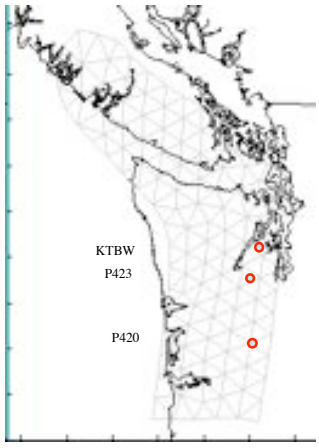
- GPS time series from PBO data products.
- Geometry of plate interface defined by McCrory et al. (2004).
- Invert for transient slip using the Extended Network Inversion Filter (Segall and Matthews, 1997; McGuire and Segall, 2003).

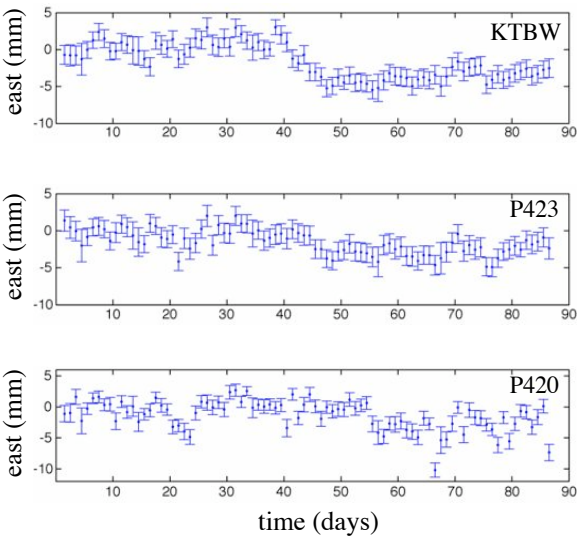
$$d(\vec{x},t) = \sum G(\vec{x})s(\vec{x},t) + L(\vec{x},t) + \varepsilon_d$$

observed GPS time series | tectonic motion | benchmark motion | white noise




# 2007 Slow Slip Event



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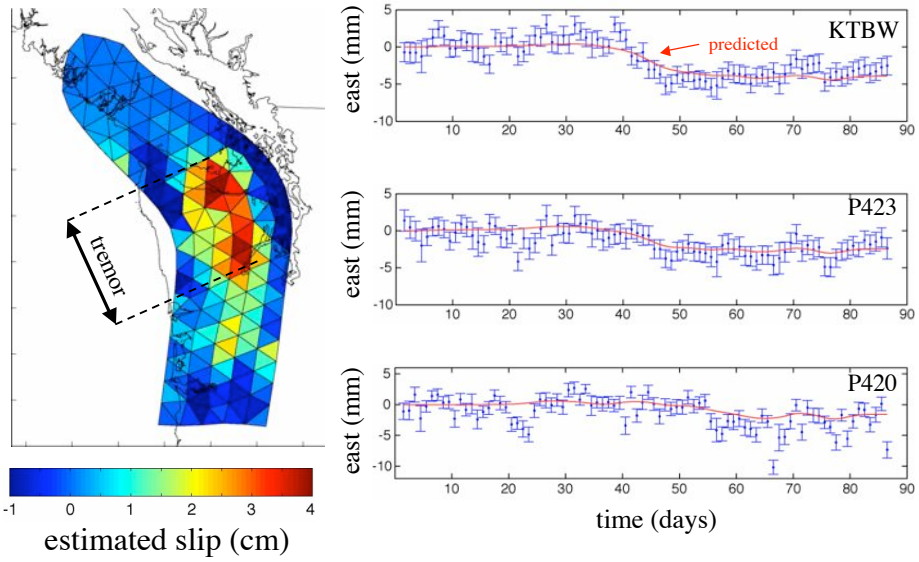
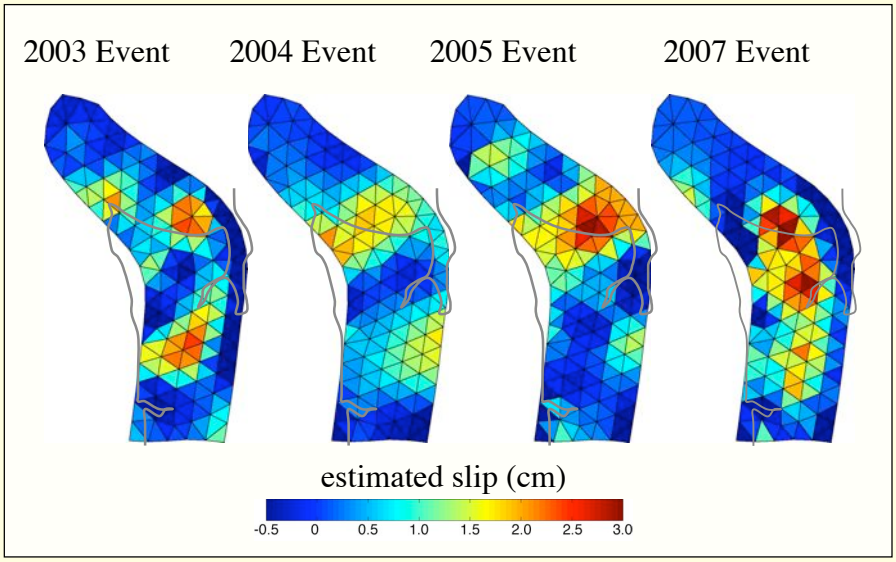
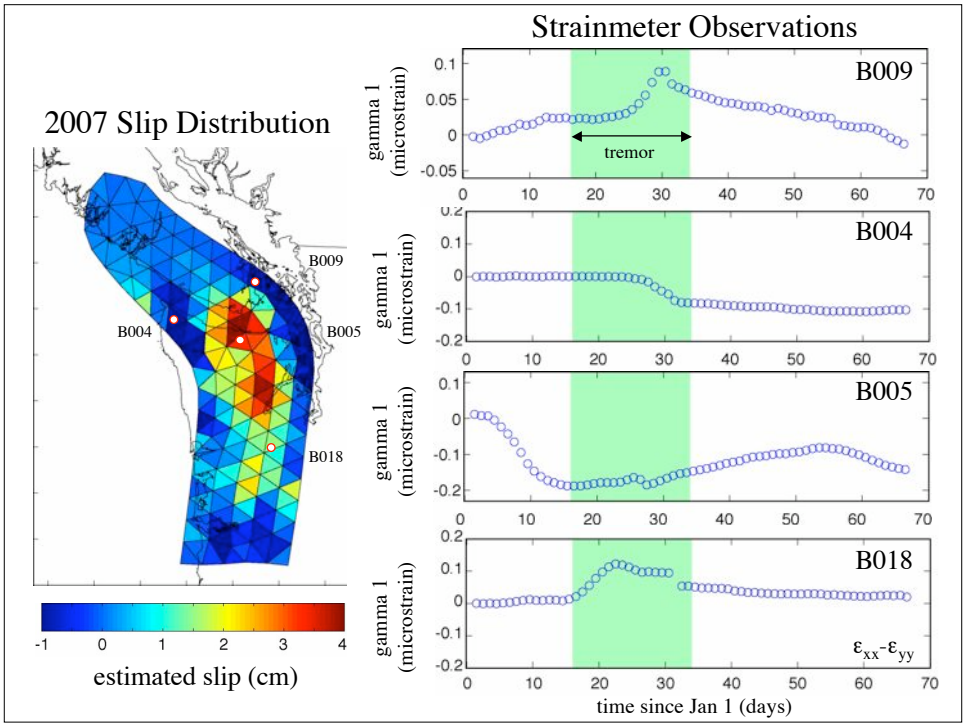



## Comparison of Recent Slow Slip Events






# Summary

2007 Slow Slip Event

- Nucleation point centered beneath Puget Sound.
- Northward propagation resolved by GPS data.
- 4 cm peak amplitude, $M_w \approx 6.8$.

Comparison of Recent Events

- Strain release is fairly continuous along strike.
- Events tend to rupture in distinct patches.
- Slip and tremor remain correlated.